Stationary Source Enforcement Series

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CONTINUOUS EMISSIONS MONITORING CONFERENCE DALLAS, TEXAS: FEBRUARY 15-17, 1977

CONFERENCE REPORT AND RESPONSES TO KEY QUESTIONS AND ISSUES

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
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CONFERENCE REPORT AND RESPONSES TO KEY QUESTIONS AND ISSUES

by

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STATIONARY SOURCE ENFORCEMENT SERIES

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This report has been reviewed by the Division of Stationary Source Enforcement and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

PREFACE

The Division of Stationary Source Enforcement (DSSE) in conjunction with the Region VI office of the U.S. Environmental Protection Agency (EPA) sponsored a conference in Dallas, Texas during February 15-17, 1977, on continuous emission monitoring. This report presents a detailed summary of the conference proceedings as well as consensus responses to some of the key questions which arose during the course of the conference. These consensus responses were jointly developed by DSSE and the Emission Standards and Engineering Division (ESED) after the conclusion of the conference.

Furthermore, these concensus reponses (which are detailed in Section II of the report) serve to either place in proper perspective, complete, correct, or modify concepts and issues presented during the conference. All responses have been reviewed and, as necessary, amended by appropriate EPA personnel to reflect the latest, most thorough agency interpretation of the various questions and issues. Section II is, therefore, intended to provide States and EPA Regional Offices with interim, but at the same time, the most current guidance to assist them in expeditiously implementing their continuous monitoring programs.

The text of the conference proceedings (Section III) is presented in a format summarizing the individual presentations and has been prepared through the use of tape recordings and notes made during the conference. Although an extensive effort has been made to present the information as accurately as possible, many of the statements have been augmented by the recollections and interpretations of the authors in an effort to clarify or complete presentations when necessary. Therefore, it should be understood that the presentation abstracts in Section III do not necessarily reflect the exact statements of the designated speakers.

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SECTION I

CONFERENCE SUMMARY

A "Continuous Emission Monitoring Conference", sponsored by the Division of Stationary Source Enforcement (DSSE) in conjunction with the Region VI Office of the EPA, was held on February 15-17, 1977 in Dallas, Texas, and was the second EPA-wide forum of its type conducted during the past two years. The conference was structured to assist state and regional personnel in implementing their continuous monitoring programs, (primarily emphasizing related NSPS requirements), through technical as well as administrative oriented presentations, to identify and discuss key unresolved continuous monitoring questions, and to present future plans for a continuous monitoring program. Agency, source, vendor and contractor personnel discussed various aspects of continuous monitoring and their individual experiences with continuous monitors. Throughout the conference much discussion was generated which led to a variety of questions. Solutions to many questions were offered, but a large number remained unanswered at the conclusion of the conference. Subsequent reviews and consideration of these questions by ESED and DSSE have resulted in answers and interim guidance to these and additional questions. Therefore, it should be noted that the responses to key questions and issues as found in Section II, as a whole, unofficially represent the latest consensus viewpoint of these two EPA divisions (as of 6/77).

The conference topics were primarily geared toward NSPS regulations, with lesser emphasis being placed on the SIP revisions and NESHAP regulations. The general format of the conference was to discuss, from the different points of view, the steps which are necessary for state agencies, Regional Offices, and sources to ensure that continuous monitoring systems become and remain workable. With group discussion providing important input to most of the presentations, topics which were presented included: the types of equipment available and their operational principles, quality assurance, regulation summaries, monitor selection and installation, pretest meetings, monitor performance specification tests, data handling and recording, inspection, use of continuous emission monitoring data and future planning.

The operating principles of various types of continuous monitors for measuring opacity and gaseous emissions were discussed with special emphasis being placed on the advantages and disadvantages of a particular type of device. A set of notes describing the basic monitoring principles was distributed to those persons attending the conference. This was followed by a description of some of the larger monitor companies, pointing out differences in marketing philosophy where some companies prefer to sell only monitors while others sell entire systems. It was noted that a variety of data handling devices are available, and the level of sophistication chosen by a source owner or operator usually depends on the resources and manpower available to him. When choosing a data handling system, consideration must be given to the normally higher manpower requirements for using and maintaining less automated devices.

Regulations controlling facilities specified in the Federal Register were described, summarizing what has to be monitored and the emissions limits. There was much discussion on the reporting requirements imposed on the source owners. The method in which sources retain data for the required two year period is not well defined by the regulations and is often left to the interpretation of the source owners. Large source to source variation is found in reporting formats, location of data, ease of retrieval, and the coordination of process and continuous emission data. This causes problems for agency personnel interested in recovering past information.

The Region VI method of determining where new sources are located is rather informal. Obtaining copies of construction permits is usually the best form of information. Very often, sources reveal themselves by requesting information from the agency. Interchange between agency and source then begins and becomes straight forward.

The State of Texas, through the effort of the Texas Air Control Board, has become a leader in implementing continuous monitoring regulations. They feel that their regulations for self-monitoring, referred to as Rule 9, work well and represent an adequate response to EPA's State Implementation Plan revision requirements for continuous emission monitors.

The question of location of monitoring systems spurred much discussion. The regulations are rather well defined for transmissometers but are less definitive in the case of gaseous monitors. There are many sections of the regulations that are left for interpretation by source and agency personnel. This often leads to a monitor being installed incorrectly or not in an optimum location. If this is the case, the source either has to move the monitor or prove that representative measurements of emissions can be obtained from the present location.

It was pointed out that early involvement by informed agency personnel can prevent the selection of continuous monitoring devices and installation sites not capable of meeting federal or state requirements. Education for source and agency personnel is also a necessity and is presently lacking. Both of the above could help prevent costly mistakes and save both industries and agencies time and monev.

Vendors of transmissometers and in-situ and extractive gaseous monitors presented working descriptions of their particular types of monitors, in addition to much valuable field information which they had acquired working with sources. Brought to light were many problems that probably were not envisioned or considered in writing the regulations, as well as many problems which have arisen as a result of the regulations. It was apparent that vendors can be a valuable source of information in developing manuals and workshops on continuous monitoring, and their input should be used.

The benefits of holding a meeting before an actual monitor performance specification test were discussed from several viewpoints. Many problems can be avoided if the meeting is held well in advance of the actual testing.

The presentation of source experience in carrying out a monitor performance test was very informative and well received by the audience. Procedural alternatives were discussed along with problems that may arise during testing. Agency personnel stated that it was their function to see that tests are run properly, and if unacceptable procedures are observed, testing should be repeated or, in very serious cases, be stopped completely. TACB also suggested that it is good policy to check the analytical procedures of testers by giving them spiked or standard unknown samples. Many useful points on observing performance tests were made. Possible methods of handling excess emission reports were discussed along with the intent of the Federal Register on the subject of data handling. Furthermore, several weak points in the regulations were pointed out.

Quality assurance programs have been started which assess the performance of continuous monitors. Results of these programs showed that, in general, gaseous monitors are meeting the accuracy specifications set forth in the regulations. The studies have only been checks on particular continuous monitoring devices and have not included system checks. These and other field inspection programs also showed that other requirements such as those of the continuous process monitoring, monitor system maintenance, and data recording areas, are very often not being met by various sources.

Overall, the conference brought out many of the needs that agency personnel have in implementing the NSPS and NESHAP continuous monitoring regulations and in helping states develop and use their SIP continuous monitoring requirements. There is an immediate need to develop guidance for observers of continuous monitoring tests, for monitoring data evalvations and inspections, and for sources installing monitors. In many areas, the Federal regulations need clarification. It is also necessary to have open communications between regions, to remain consistent when alternative procedures are developed and determinations made. Guidance in these areas would be of great use. Additional technical background is also needed for states to revise their SIPs to incorporate continuous monitors.

Future plans for continuous monitoring programs were presented, and other programs, which would be invaluable for agency people to carrying out their operations, were discussed. The responses to a questionnaire on the scope of the conference pointed out where efforts should be directed and relayed the message that the conference was accepted very favorably by those who were present.

SECTION II

ESPONSES TO KEY QUESTIONS AND ISSUES RAISED DURING THE CONFERENCE

During the course of the conference, many key questions and issues arose which were fielded either by the speakers or by other participants in the conference. In the section below, those of significant importance have been delineated along with the answers and discussions which followed. An attempt has been made to place each individual question under one of several topical headings. For this reason, answers to some questions may rightfully overlap into one or more additional categories and may even appear to be out of context.

The following text has been reviewed by personnel from the Division of Stationary Source Enforcement (DSSE) and from the Emission Standards and Engineering Division (ESED). The answers offered during the conference sessions by the named individuals along with those responses which resulted from the subsequent input (herein designated as "Supplemental Consensus Viewpoint") of the DSSE and the ESED define, in terms of the subject and within the limits of the questions, the current thinking of these two offices. As such, consensus viewpoints serve to either place in proper perspective, complete, correct, or modify any substantive but unclear or ambiguous responses made during the conference. It is certainly the intention that this Section be used by States and EPA Regional Office personnel to complement and assist in the effectual and expeditious implementation of their continuous monitoring programs.

A. Communication With Sources

1. HOW ARE SOURCES NOTIFIED OF CONTINUOUS MONITORING SYSTEM (CM) REGULATIONS (AND CHANGES IN THE REGULATIONS)?

   R.J. Woods, E.I. DuPont (Source): The State's construction permit outlines continuous monitoring requirements for his plant.

   R.E. James, TACB (State Agency): I feel that TACB has been a little remiss in keeping in touch with sources. We need to answer questions before they become problems.

   J. Cohen, EPA, NEIC: One problem is that the questions often do not arise until after the fact.

   L.R. Paley, EPA, DSSE: Officially, through the Federal Register, in addition some agencies notify their sources on an intermittant basis.

2. CAN A SOURCE BE REQUIRED TO ATTEND A PRE-TEST MEETING?

L.R. Paley: Although most people (sources and agencies alike) believe it is advantageous to do so, probably not, if they do not want to cooperate.

3. CAN A NSPS SOURCE (WHICH IS REQUIRED TO OPERATE CM's) START-UP WITHOUT HAVING ADEQUATE CONTINUOUS MONITORING SYSTEMS?

L.R. Paley: Yes, because the source is not required to adequately operate the CM until prior to his conducting the performance test (60 days after achieving maximum production, but no later than 180 days after initial start-up) and does not have to demonstrate that the CM meets EPA's performance specifications until (up to) 30 days after the performance test.

B. Continuous Monitor Types, Costs, and Maintenance

1. IS CONTINUOUS MONITORING TECHNOLOGY SUFFICIENTLY ADVANCED TO JUSTIFY THEIR REQUIREMENT? WHICH (IF ANY) TECHNOLOGIES WORK WELL OVER THE LONG TERM?

L.R. Paley: Yes, our experience presently indicates that those CM's which pass the performance evaluation test will work well over the long term. These are two of the objectives of the Quality Assurance Branch's (QAB) surveys concerning quality control in continuous monitoring. There is not enough data accumulated yet to determine precisely how well monitors work, but the surveys are to be continued in expanded form.

Supplemental Consensus Viewpoint: Yes, preliminary findings of the QAB and other agency studies show that it is sufficiently advanced to justify the present requirements.

2. HOW DOES THE COST OF CONTINUOUS MONITORING EQUIPMENT RELATE TO PLANT SIZE? WHAT ARE THE COSTS OF SAMPLE CONDITIONING? OF DATA HANDLING?

F.C. Jaye, Acurex/Aerotherm (Contractor): Costs are fairly independent of plant size. Opacity instruments will run from $6,000 to $9,000 generally; other, $5,000 to $7,000 per instrument. Some variation in cost will arise in the interface between stack and instrument, and in the sample conditioning equipment. There will also be wide variations in data handling costs depending on the complexity of the data handling system desired.

Supplemental Consensus Viewpoint: The costs given above are capital costs per pollutant. A more

detailed discussion of costs is outlined in the 6 October 1975 preamble of the regulations. Highlights are as follows:

> "...For opacity monitoring alone, investment costs including data reduction equipment and performance tests are approximately $20,000, and annual operating costs are approximately $8,500. ...For power plants (using) opacity, nitrogen oxides, sulfur dioxide, and diluent monitoring systems, the investment cost is approximately $55,000, and the operating cost is approximately $30,000 (annually)..." These estimates are intended to reflect installation costs, data reduction and recording costs, and evaluation costs -- based on 1975 dollars.

3. WHAT ARE TYPICAL MAINTENANCE HISTORIES FOR CONTINUOUS MONITORING SYSTEMS?

H.C. Lord, EDC (Vendor): We have found that to date users are not motivated to maintain their own systems. EDC feels that it should perform maintenance on its monitors.

D.J. Lester, LSI (Vendor): Maintenance is up to the customer. Most companies choose to have their own personnel do the maintenance; there is a wide variety among plants in the extent of this maintenance.

W.F. Fuller, E.I. DuPont (Vendor): A preventive maintenance program including probe inspection is recommended about twice a year. Routine maintenance by the customer is encouraged by equipment design and instructional documentation.

4. WHAT ARE THE RELATIVE ADVANTAGES OF SINGLE-PATH AND DOUBLE-PATH TRANSMISSOMETERS?

F.C. Jaye: As they are being built right now, the double-path instruments tend to be less sensitive to misalignment. If correctly installed, there are no theoretical advantages to either. The double path instruments do perform slightly better at low opacities.

Supplemental Consensus Viewpoint: We presently do not know of any single pass instrument that meets the zero, span and calibration requirements set forth in the regulations. Fiber optics may permit the future use of single-path systems.

5. ARE THERE ANY MONITOR SPECIFICATIONS FOR VINYL CHLORIDE CONTINUOUS MONITORS? IS THERE SOME EQUIVALENT, SUBSTITUTE METHOD?

There are presently no monitor specifications or methods, and none will be available in the near future. OR&D has long range plans to develop this information.

Supplemental Consensus Viewpoint: There are no monitor specifications or methods, and none are being considered except as noted in Part 61 of the 21 October 1976 Federal Register.

6. WHAT IS THE USUAL RELATIONSHIP BETWEEN THE SELLER AND THE INSTALLER OF MONITORING EQUIPMENT?

H.C. Lord: The seller is usually responsible for obtaining the purchase order. At that point, an installer usually takes over supervision of the installation and certification of the CM.

7. DO (OR WILL) MONITOR VENDORS SUPPLY LITERATURE TO AGENCIES CONCERNING THEIR EQUIPMENT?

R.E. James: Very few do or will. Lear Siegler has a well-done presentation for agency personnel.

C. Continuous Monitoring Data -- Uses and Handling

1. MUST SOURCES CONVERT ALL OF THEIR DATA TO THE UNITS OF THE STANDARD (i.e., CORRELATING VARIOUS TYPES OF DATA SUCH AS POLLUTANT, DILUENT AND FUEL INFORMATION)?

L.R. Paley: No, they are only required to reduce their data to specified averages. Any excess emissions must be converted and reported in the units of the standards.

2. HOW MUCH MANPOWER IS REASONABLE FOR DATA REDUCTION BY THE SOURCE?

L.G. Jones, EPA, ESED: At one time, use of continuous monitoring data for modeling (SARDOS, etc.) was considered, but it was decided that it was not reasonable to require more extensive data than necessary to determine excess emissions. Sources are now required to keep raw data for two years, so that it will be available if EPA wishes to pursue more extensive analyses.

L.R. Paley: EPA is not really the best group to answer this question. However, it is important to understand that EPA did carefully consider the ramifications upon manpower requirements (both agency and non-agency) when it was developing the CM regulations. Basically, these regulations were

designed to provide the necessary information without being overly burdensome. Furthermore, it is important to note that the quantity of manpower expended to reduce CM data is not only a function of the regulations, but is also greatly affected by such things as the degree to which the source automates his CM as well as the level of competency of his personnel.

3. MUST A SOURCE THAT REMAINS WELL IN COMPLIANCE REDUCE ITS DATA (AT LEAST) EVERY QUARTER? (ASKED BY A SOURCE HAVING VERY LOW EMISSIONS)?

   All data must be recorded periodically, averaged and stored, but only excess emissions must be reduced to units of the applicable standard.

4. HOW IS THE TWO-MINUTE-PER-HOUR OPACITY EXEMPTION HANDLED BY AUTOMATIC DATA PROCESSING SYSTEM? IN THE QUARTERLY REPORTS?

   Supplemental Consensus Viewpoint: EPA will soon promulgate the following response to this question (as part of its response to the court remand - Essex Chemical vs. Ruckelshaus). An excess opacity emission will be any 6-minute period which exceeds a 20% (average), except for one 6-minute period per hour which exceeds 27% (average) opacity. Therefore, the data generated by an automatic data processing system can be used directly to determine the source's compliance status.

5. IS CONTINUOUS MONITORING DATA ALL THAT IS REQUIRED TO BE SUBMITTED QUARTERLY OR IS SUPPLEMENTARY, EXPLANATORY INFORMATION ALSO REQUIRED?

   Supplemental Consensus Viewpoint: Reports must include excess emissions, auxilliary process information, monitor malfunction information, etc. See Part 60.7 of the Federal Regulations.

6. WHAT IF A SOURCE WISHES TO COMBINE (ARITHMETICALLY) READINGS FROM MONITORS ON SEVERAL SIMILAR PROCESSES USING A COMMON STACK?

   L.G. Jones: Generally, we would want all the data individually, in case one of the sources was out of compliance. However, in the special case where each of the processes is subject to the same emission standard, monitors installed on the common stack (to report the combined emissions) may be acceptable. The question of how to combine data from separate monitors is still under consideration.

Supplemental Consensus Viewpoint: This is normally a case for review by the Regional enforcement office, and should be handled on a case by case basis.

7. DOES LITERATURE SUPPLIED BY VENDORS HELP WITH MEETING THE DATA (SUB-SYSTEM) REQUIREMENTS?

H.C. Lord: We outline the data reporting requirements for our customers. Other vendors probably do much the same.

L.R. Paley: So far most vendors provide very little guidance concerning the data sub-system.

8. WHAT MIGHT ACCOUNT FOR VARIATIONS BETWEEN TRANSMISSOMETER READINGS AND METHOD 9 OPACITY OBSERVATIONS?

D.J. Lester: Diffusion of light, chemical reactions or condensation of acid gases, poor monitor maintenance, and the presence of water vapor are some of the things which can lead to such variances.

L.R. Paley: The most well-known case of this variance occurs at oil-fired combustion sources (due to the acid droplet formation from the sulfur in the fuel).

9. HAVE ANY CORRELATIONS BEEN ESTABLISHED BETWEEN TRANSMISSOMETER OR OPACITY READINGS AND MASS EMISSION RATES?

L.R. Paley: Some curves have been generated (for coal-fired power plants, cement plants, coke pushing operations, catalytic crackers, asphalt concrete, sewage sludge incinerators, secondary brass and lead, kraft pulp recovery boilers and hog fuel boilers) by ESRL/RTP and DSSE and non-agency groups. Particle size has an effect on opacity, yet some of these correlations look good. More data is needed.

10. WILL EPA REQUIRE THE REGIONS TO USE <u>EXISTING</u> CONTINUOUS MONITORING DATA FOR ENFORCEMENT?

R. Biondi, EPA, DSSE: States may use continuous monitoring data for direct enforcement. EPA,(except for smelters) however, cannot (presently) directly enforce NSPS or NESHAP emission limits based on continuous monitoring data.

L.R. Paley: There is some possibility that additional regulations will require or permit this in the future.

11. WHY IS CONTINUOUS MONITOR DATA NOT DIRECTLY USEABLE TO DETERMINE COMPLIANCE WITH A NSPS EMISSION STANDARD?

L.G. Jones: The original purpose of continuous monitoring was to track the plant operations and maintenance performance. Enforcement of the emission standard is still based upon performance (source) tests. The only exception thus far is with primary smelters. Even in this case, the CM cannot be used as a "continuous" means of determining compliance (i.e., agency must pre-designate a specific period as a "Performance Test" period).

L.R. Paley: As noted above, these may change in the future.

D. Location of Continuous Monitors

1. ARE VENDORS ASKED TO HELP SOURCES MEET THE INSTALLATION REGULATIONS? CAN THEY SUPPLY LITERATURE? HOW MUCH ASSISTANCE IS PROVIDED?

H.C. Lord: EDC engineers will work with plant engineers. Accessibility and obtaining representative samples are the main criteria. We do not specify locations, we just remind the source of what the regulations require.

W.F. Fuller: Monitor location is mostly a matter of common sense. Extractive monitors and the associated probes are flexible with regard to ability to sample at a representative point. A simple traverse can help to resolve the question of representativeness.

D.J. Lester: LSI always suggests that the appropriate agency be contacted before installation begins. We hand out lots of underlined Federal Registers and put the source in contact with agencies.

L.R. Paley: Essentially the vendors are presently providing very little assistance on this subject. The unfortunate thing is that many sources do not realize (until it is too late) how important proper location of its monitor probe(s) (pollutant and diluent) is to achieve valid emission data.

2. CAN SOURCES BE MADE TO COMPLY WITH THE 8-DIAMETER? CRITERION CONTAINED IN SPECIFICATION 2 (GAS CM LOCATION)?

L.R. Paley: No, however, as one can see (in 4.2 of CM Specification 2) it is often to the source's advantage to locate his monitor at least 8 diameters downstream from any air inleakage to the effluent stream.

Supplemental Consensus Viewpoint: The key criteria for proper location of a CM is: (a) to obtain a representative sample of the effluent gas stream, (1) locating the probe (if needed) of the diluent monitor in close proximity to the pollutant monitor's probe, such that one ensures a common representation of that stream, (2) locating the probe where gas mixing has been completed; and (b) to locate the probe where servicing and checking can be performed fairly easily.

3. MUST EPA ACCEPT A MONITOR AND ITS DATA WHICH IS NOT LOCATED IN THE STACK?

L.R. Paley: Yes, as long as the source demonstrates that its measurements are (or have been corrected to) consistently representative of the exhaust gas stream, and are consistently within 20% of the results of a valid (including location) reference method test. Achievement of these requirements will be facilitated if the source follows the criteria delineated in the previous response.

Supplemental Consensus Viewpoint: Although EPA must accept such data, the source should be cautioned that if he substantially separates the CM from the reference method test location, he runs the risk of introducing additional differences in the results between the two monitoring locations. Regardless of this, he still must demonstrate a consistant relationship (±20%) between the two.

4. IS THERE A CONFLICT BETWEEN THE IDEAL COMPLIANCE LOCATION FOR A MONITOR (BOTH POLLUTANT AND DILUENT) AND THE IDEAL PROCESS MONITORING LOCATION?

L.R. Paley: Sometimes there can be a conflict, particularly in the case of the diluent monitor (O_2 or CO_2) at fossil fuel fired steam generators (FFFSG). FFFSG operators generally prefer to locate their O_2 or CO_2 monitors just downstream of the burner (i.e., upstream of the air preheater); however, such a location generally will not meet the criteria previously delineated.

Supplemental Consensus Viewpoint: For the agency's purposes, the combination of pollutant and diluent CM's should represent emissions being exhausted. Therefore, both should account for any air in-leakage and chemical and physical reactions which occur prior to being exhausted.

5. HOW SHOULD THE REGIONS HANDLE THE FACT THAT A MANUAL SAMPLING LOCATION IS NOT SPECIFIED FOR VERIFYING THE PERFORMANCE OF IN-SITU CM's?

Since the purpose of doing manual sampling is to establish the relationship between the monitor and the reference method, it is desireable (if possible), but not required to take manual samples at the location of the monitor.

Supplemental Consensus Viewpoint: (There are two separate criteria.)

1.) In the case of the CM specification test, the Reference Method test logically should represent the same effluent stream as the CM. Moving the Reference Method test point away from the CM inlet increases the chance that the CM will not be greater than or equal to 20% relative accuracy (but the source can make the decision at his own risk).

2.) In the case of proper location, the CM must be located such that it directly represents (or can be corrected to represent) total emissions (Specification 2, No. 4). Also, when the source conducts the performance test, using Reference Methods, it must be done in conformance with the requirements contained in Part 60 and all relevant Reference Methods (i.e., Reference Method 1, etc.). Therefore, if the source chooses to perform simultaneous performance test and CM specification test, it is at his own risk.

6. WHERE SHOULD MANUAL SAMPLES BE TAKEN IF A MULTI-POINT PROBE IS BEING USED? (STRATIFICATION IS ASSUMED)

The simplest approach is to take Reference Method samples at some other location in the system where a representative sample would be expected (i.e., no stratification). Otherwise, Reference Method tests should be done while traversing the stack.

Supplemental Consensus Viewpoint: This case is not adequately discussed in the regulations and probably would require a Regional Office decision on a case-by-case basis.

7. IF STRATIFICATION IS SUSPECTED, IS IT PREFERABLE FOR THE SOURCE TO USE A MULTI-POINT PROBE OR A SINGLE-POINT PROBE PLACED AT A REPRESENTATIVE LOCATION?

W.F. Fuller: This is not a common problem. Sometimes samples from several points are mixed. Your best choice is to move the probe to a better location.

8. COULD TEMPERATURE, O_2, OR OTHER EXHAUST GAS STREAM GRADIENTS BE USED TO FIND A REPRESENTATIVE (OR ONE CORRECTABLE TO BE REPRESENTATIVE) POINT AT WHICH TO PLACE A SINGLE-POINT PROBE IN A STRATIFIED FLOW?

L.R. Paley: Sure, if it is well established that the sample will be representative (or one correctable to be representative). However, adequate documentation of this would be difficult. Therefore, it is probably not worth the effort. It is easier for the source to move to a better location. (This question could use more study.)

E. Testing, Observation of Tests, Calibration, Certification

1. WHEN SHOULD THE MONITOR PERFORMANCE SPECIFICATION TESTS BE DONE IN RELATION TO THE SOURCE's PERFORMANCE TEST?

Q. Wong, S&A, Region VI, EPA: In Region VI, both tests are usually shceduled at the same time. If a problem arises, both tests are postponed.

Supplemental Consensus Viewpoint: Concurrent tests are usually cost effective to the source. EPA only requires that the CM performance specification test be done within 30 days after the performance test.

2. WHAT TIME INTERVAL REQUIREMENTS ARE THERE FOR PERFORMING THE CONCURRENT REFERENCE METHOD TESTS DURING THE CM PERFORMANCE SPECIFICATION TEST?

R.E. James: There is no requirement to spread them out (although common sense would suggest it). If the tester chooses to do them back-to-back and there are no testing problems, an accuracy test for one gas monitor can be done in nine hours. In practice, manual testing will usually be carried out over two or three days.

3. MUST MONITOR PERFORMANCE SPECIFICATION TEST EVER BE REPEATED? WHEN?

L.R. Paley: Not if the monitor is in compliance. Therefore, retesting would normally be done only if we want to revalidate the monitor's accuracy. (We still have to do some thinking on this subject.)

Supplemental Consensus Viewpoint: The Administrator can require retesting of the CM's whenever he deems it appropriate (i.e., questionable data, substantial CM modifications or repairs, etc.).

4. MUST THE MONITOR "CONDITIONING PERIOD" BE DONE DURING CONDITIONS OF "NORMAL PLANT OPERATION"? WHY NOT IN THE FACTORY?

   It is to the mutual benefit of both source and agency that the monitor should not be certified at conditions greatly different from actual source conditions. The primary purpose of this period is to determine that the CM is properly operating prior to initiating the (resource intensive) operational period.

   Supplemental Consensus Viewpoint: It was found that a monitor's performance is very sensitive to the site and the environment. Therefore, one could not effectively accomplish the primary purpose of this period in the laboratory.

5. HOW DOES PLANT DOWNTIME AFFECT THE CONDITIONING (NOT THE OPERATIONAL) PERIOD?

   L.G. Jones: The object of the first 168-hour test period is to test the monitor (not the source) to try to ensure that it is generally capable of operating properly. If the source goes down, the regulations do not require the source to re-start the 168-hour period. One might just continue where things were left off. The objective is to obtain 168 hours of operating time on the monitor under plant conditions without failure of the monitor.

6. WHAT CAN BE DONE TO THE MONITOR DURING THE CONDITIONING PERIOD? THE OPERATIONAL TEST PERIOD?

   L.G. Jones: The monitor should not be touched, except for normal calibration and maintenance checks as recommended by the manufacturer, during both the conditioning and operational test periods.

7. WHAT IF A STATE AGENCY IS INCAPABLE OF PROPERLY EVALUATING A CONTINUOUS MONITOR PERFORMANCE SPECIFICATION TEST?

   J. Cohen: DSSE has a training course on how to perform such evaluations.

   L.R. Paley: DSSE can also provide contractors to perform such evaluations.

8. HOW SHOULD ONE GO ABOUT OBSERVING A PERFORMANCE EVALUATION IF UNFAMILIAR WITH THE EQUIPMENT AND/OR DUBIOUS ABOUT THE VALIDITY OF THE RESULTS?

   L.R. Paley: Read and use the various DSSE manuals

and guidelines on the subject; go out with an experienced observer at first. These people are available through DSSE.

Few sources will run the risk of being caught defrauding the government, therefore, a good technical evaluation should result in obtaining sufficient agency confidence in the data of the system.

R.E. James: Admit your ignorance and ask questions. Try to obtain instrument manuals from vendors prior to the observation.

F.C. Jaye: Monitors are not as "magic" as they seem. The number of repetitions required for each test makes consistent fudging almost impossible. Most sources and vendors are interested in complying properly.

R.J. Woods: Most sources use outside firms for testing; these people will probably resist manipulation by the source.

9. MUST THE MONITOR CALIBRATION BE OBSERVED DURING THE CM PERFORMANCE SPECIFICATION TEST? WHY CAN'T CALIBRATION BE DONE IN THE FACTORY?

L.R. Paley: No. It really depends upon the agency resources, its confidence in the source, etc., as to whether or not they are observed.

Supplemental Consensus Viewpoint: Extractive monitor calibration is required to be done on-site. The in-situ calibration can be done in the factory where the gas cells are prepared.

10. IF THE RESULTS FROM A REFERENCE METHOD TEST ON A CYLINDER OF CALIBRATION GAS YIELDS A DIFFERENT VALUE FROM THE CYLINDER TAG VALUE (WITH OR WITHOUT NBS TRACEABILITY), WHICH SHOULD BE USED WHEN CALIBRATING AN INSTRUMENT?

R.J. Woods: We would go with the reference method test value rather than the cylinder tag value. This would give us a better correlation with the performance (stack) test results.

L.R. Paley: I agree; theoretically the difference should be small, but both gas vendors and testers are still making too many errors. (EPA must give this more thought.)

Supplemental Consensus Viewpoint: At this time EPA has not specified the necessary protocol which gas vendors would have to follow before their tag value could be correctly deemed "NBS traceable" (as specified in the CM regulations). Therefore, one should use the value obtained from the reference method test, but only after one is sufficiently convinced that those results were acquired through the proper use of the method and that test was done on the cylinder within two weeks prior to the CM's performance specification test.

11. SHOULD THE 10% ZERO OFFSET BE REQUIRED IF EXTENSIVE MODIFICATIONS (i.e., COMPUTER REPROGRAMMING) ARE NECESSARY TO QUANTIFY NEGATIVE ZERO DRIFT DURING THE PERFORMANCE SPECIFICATION TEST?

Maybe not. One solution is to permit the use of a digital voltage readout instrument hooked into the analyzer on the stack. Then the source could establish a relationship between the voltmeter readouts and the computer (recorder, etc.) printout.

12. CAN A GAS MONITOR BE ZEROED USING AMBIENT AIR?

Yes, either certified zero gas or ambient air is acceptable. The source may elect to use ambient air to save money.

13. HOW STRICT ARE THE REGULATIONS REGARDING DETERMINING THE SPAN FILTERS' DENSITIES?

L.R. Paley: As with any of the requirements, an alternate procedure can be approved.

D.J. Lester: Most filters will not be exactly a certain density, but will fall within a range of approximately ±15%.

J.A. Jahnke, Northrop (Contractor): A filter-check transmissometer can be built easily for calibrating span filters.

14. WHEN CHECKING AN INSTALLED MONITOR AGAINST A PORTABLE UNIT, WILL ZERO AND SPAN CALIBRATIONS OF THE PORTABLE ONE BE SUFFICIENT TO ENSURE THAT IF THE TWO MONITORS READ DIFFERENTLY, THE PERMANENT MONITOR IS THE ONE GIVING FALSE READINGS?

H.C. Lord: Yes, this assumption should be OK if both samples are representative. Some other causes for this difference are wet vs. dry basis, stratification, sensitivity to temperature, or other differences which can affect readings on the portable.

L.R. Paley: If there is a significant difference,

the inspector may choose to perform some simple, fast troubleshooting, such as; (1) make sure both CM's are evaluating the same gas stream; (2) analyze a sample of the source's calibration gases taken from the inlet to the in-stack monitor with the portable monitor; (3) take a sample of stack gas to the agency lab to evaluate on a carefully calibrated analyzer, being sure that the gas is not changed during transit by condensation, reaction, etc., and; (4) verify that both monitoring systems are not measurably affected by characteristics of the stack gas (such as temperature, moisture, interfering components and particulates).

15. CAN (OR SHOULD) A TESTER BE REQUIRED TO PERFORM LAB ANALYSES FOR THE MANUAL TEST METHODS ON SITE? HOW ABOUT SPLITTING THE SAMPLES?

L.R. Paley: Yes. The agency could request a field analysis to demonstrate the tester's technique, proficiency (on spiked samples) and to be observed.

D. Stonefield, S&A, Region I, EPA: We (Region I) often ask the contractor to hire a local lab so that if we choose to, we can observe performance, lab conditions, etc.

R.E. James: Having them analyze samples of known concentration seems like a reasonable technique to rapidly check the tester's capability.

P.C. Schwindt, S&A, Region VI, EPA: Cannot split particulate and NO_x samples, and there is usually not enough SO_2 reagent to split.

J. Cohen: A correct analysis of a spiked sample only shows that the lab can do good work, not necessarily that they always will.

Supplemental Consensus Viewpoint: The idea may be appropriate, but the agency must recognize that field conditions may introduce added errors and may be non-representative of the tester's normal performance, particularly if he normally does the analysis in the lab.

16. WHAT OPTIONS DOES AN AGENCY OBSERVER HAVE WHEN BAD WORK IS WITNESSED?

If you see bad work: (1) tell the tester immediately, (2) tell him you will reject his results, (3) suggest that the tests be redone, (4) if he will not redo them, tell source that it is his choice. Do not wait until it is done and then reject the results.

Most testers will cooperate. If the poor technique continues, (yielding a basis for rejection), inform the source, document specific problems thoroughly and return to the office.

17. HOW LONG SHOULD A TEST OBSERVER REMAIN ON SITE? WHAT IF THINGS ARE GOING SMOOTHLY? OR NOT GOING AT ALL?

L.R. Paley: This is a matter of personal discretion and must be decided on a case-by-case basis. Consider the reputations of the tester, source and instrument vendor when deciding. Primarily, one should observe, evaluate and document a sufficient quantity of the test to have adequate confidence in the results.

18. HOW SHOULD O_2 AND CO_2 MONITORS BE EVALUATED? (NO REFERENCE METHOD COMPARISONS ARE REQUIRED)

L.G. Jones: The use of calibration gases is believed to be sufficient.

Supplemental Consensus Viewpoint: Follow the procedures outlined in Appendix B, Performance Specification No. 3.

19. WHEN SHOULD CERTIFIED CONTINUOUS MONITORS BE REINSPECTED?

Q. Wong: None have been reinspected in Region VI since testing.

Supplemental Consensus Viewpoint: Reinspect them whenever the agency has doubts about the validity of results as part of a regular source inspection plan or continuous monitor reevaluation plan.

20. WHAT SHOULD THE AGENCY DO WHEN IT FINDS A MONITOR INOPERATIVE?

R. Biondi: To prove a violation, the agency must demonstrate that source negligence is responsible for the monitor being inoperable. One option is simply to require a new performance test of the CM after seeing that it is serviced.

Supplemental Consensus Viewpoint: Determine why it is down. Require the source to operate it as soon as possible. Also, it may be appropriate to verify its proper operation for several months by requiring monthly excess emission reports and by requiring extra evaluations of their CM's.

F. Enforcement, SIP's, NSPS

1. DOES THE PROVISION FOR MONITORING SULFUR CONTENT

IN FUEL CIRCUMVENT THE INTENTION OF THE CONTINUOUS MONITORING REGULATIONS? WHAT FUEL MIXES QUALIFY FOR A LOW-SULFUR EXCLUSION?

R. Biondi: Fuel monitoring regulations are still being developed; sources must await finalization. Fuel mixes should be handled on a case-by-case basis.

Q. Wong: Mixed fuel sources must still be monitored as required by NSPS.

2. WHY IS THE SO_2 MONITOR USED FOR COMPLIANCE IN THE CASE OF SMELTERS?

For the smelting process, a long-term sample (6-8 hours) is needed to integrate the effects of process fluctuations. Method 6 is not adaptable to such long-term testing.

Supplemental Consensus Viewpoint: EPA acquired sufficient experience and data to show that the monitor reliably could provide valid results.

3. WHAT SHOULD AGENCIES DO WITH EXCESS EMISSION REPORTS?

T.A. Gibbs, AHM, Region IV, EPA: Do not look at just the excess emission report; review all reporting done by the plant. If a problem is indicated, a follow-up evaluation or a retest of the source and/or monitor would be advisable.

Supplemental Consensus Viewpoint: Compare them with the previous quarter's information and the baseline data obtained during the performance specification test. Compare data with other similar plants to determine adequacy of the continuous monitoring system, and identify possible major or recurring problems which source should resolve.

4. HAS HEADQUARTERS PROVIDED THE REGIONAL OFFICES WITH GUIDELINES FOR REVIEWING SIP's? ARE GUIDELINES PRESENTLY BEING USED BY THE REGIONS WHEN REVIEWING CONTINUOUS MONITOR SIP REVISIONS?

R. Biondi: DSSE's Guideline S-26 incorporates a model regulation revision for this purpose.

5. WILL THERE BE A NATIONAL PROMULGATION TO COVER DEFICIENT SIP's? WHEN? OR WILL REGIONS HAVE TO HANDLE SIP's ON A STATE-BY-STATE BASIS?

G. Rust, CPDD, EPA: A national promulgation is being

developed (for a mid '78 promulgation) by EPA.

I.Z. Milner, AHM, Region III, EPA: Regions should not be wasting their resources to cover something that is going to happen anyway by means of a national promulgation.

6. REGARDING REQUIREMENTS AND ENFORCEMENT OF SIP's, WHOSE DECISIONS TAKE PRECEDENCE, THOSE OF THE STATE OR THE REGIONAL OFFICE?

The states make the decisions, but they must submit their decision-making procedures to the Regional Office for approval.

7. WHAT IS THE PROCEDURE FOR ADDING NEW SOURCE TYPES TO THE PRESENT FOUR FOR WHICH STATES MUST PROMULGATE CM REVISIONS?

R. Biondi: The states have the latitude to add new source categories as the need arises. The Appendix P requirements were intended to be "minimum" requirements.

J. Key, TACB (State Agency): We (TACB) had the opposite view ... that we have to wait for promulgation in Appendix P before we could expand the list.

8. WHY ARE THERE NO EXCESS EMISSION REPORTING REQUIREMENTS FOR OPACITY FROM STEAM GENERATORS?

R. Biondi: These were "reserved" until we rehash the opacity standards for steam boilers and submit a brief to the court in response to the litigation we have received (Essex Chemical vs. Ruckleshaus).

NOTE: The December 5, 1977 Federal Register promulgation of EPA's response to the remand removed this reporting reservation. Therefore, NSPS steam generators must submit excess emission reports including opacity.

SECTION III

PROCEEDINGS: SUMMARIES OF CONFERENCE PRESENTATIONS

OPERATIONAL PRINCIPLES - Fred Jaye, Acurex/Aerotherm

Fred Jaye described the basic concepts of the three types of continuous monitors in operation and the advantages and disadvantages of each.

I. Transmissometers
   A. Double-ended: light source sends a beam of light across stack; reflector sends beam back. Photoelectric cell then compares intensity as it returns
      Advantages:
      1. less sensitive to mislignment in stack
      2. easier to compare two light beams with same photoelectric cell
   B. Single ended: light source sends a light beam across stack to a photoelectric cell - no return

II. Extractive Monitors
   A. Electrochemical: gas diffuses through membrane into electrolyte; voltage is read
      1. Advantages
         a. inexpensive, portable
         b. can be made to respond to different gases
      2. Disadvantages
         a. requires a very stable temperature
         b. requires a very good gas conditioning system
   B. Chemiluminescent: Also Flourescent (UV excitation) Chemical reaction (e.g., NO + O_3) excites gas molecules; light is measured
      1. Advantages
         a. very high sensitivity
         b. good selectivity
      2. Disadvantage
         a. very few compounds give the chemical reaction

III. In-Situ Monitors
   A. Non-dispersive Infrared (NDIR). Principle: IR absorption by selected molecules
      1. Advantages
         a. large number of organic and inorganic compounds are infrared absorbent
         b. can be more specific
         c. simple operation
      2. Disadvantages
         a. only filtering comes from absorption characteristics
         b. water vapor interferes with infrared absorbency and may also damage components
         c. only one component can be monitored

B. Non-dispersive ultra-violet analyzers: Principle: UV absorption by selected molecule
   1. Advantages
      a. water vapor has no absorption bands
      b. uses conventional optics
   2. Disadvantages
      a. limited in number of measurable pollutants
      b. poor selectivity

MONITORING REGULATIONS - Fred Jaye, Acurex/Aerotherm

Monitor performance specification tests are required within 180 days of initial facility startup or within sixty days after maximum production rate is reached, if that will move up the testing date. A test report must be submitted within 60 days after completion of the test as outlined in 60.13.

Under part 60.7 of the New Source Performance Standards, the following records must be kept for two years:

- -any periods in which the monitoring system is inoperative
- -any monitoring device or system testing evaluations
- -any performance test measurement
- -all calibration checks
- -any adjustments or maintenance performed on the systems

These records must be kept for inspection, although a particular form is not specified.

The following data must be included in quarterly reports submitted to Regional EPA offices:

- -data worksheets
- -reference method comparison test worksheets
- -maintenance records from the monitoring system
- -any F-factor or conversion factors from data and how they were derived
- -production rates for the facility during the time period that the monitor was being tested

IMPLEMENTATION OF REGULATIONS - Gary Bernath, Region VI; Howard Houston and Bob James, TACB

In identifying which sources are covered by NSPS regulations, there are four ways that the agency can find new sources or expansions of the old sources:

- -monthly reports submitted
- -those sources receiving permits from states
- -the "grapevine"
- -sources that actually comply with regulations and notify the agency

After recognizing these sources, a form letter is sent to the sources to acquire information about their emissions, etc., in order to determine whether or not they come under NSPS regulations. If it is officially determined to be NSPS, the source is

informed of various requirements including that the compliance test must be run within 180 days of facility startup. The test report is then submitted within 60 days and analyzed, and the source is notified of the results. If the test fails, consultation between the source and agency determines problems and changes to be made by the source to meet standards. If the test passes, the source is, of course, notified and congratulated, and reminded of submission of quarterly reports. These reports are compared to the original sample test and to previous reports for changes in results, operating conditions, etc.

Texas has not received authorization from the agency to enforce SIP's and NESHAP regulations; only existing sources that were not constructed under NSPS are being considered for monitoring requirements. Because of the legal problems in making changes in SIP rules, TACB attorneys reviewed the SIP's and decided that Rule 9 was adequate as it stood for enforcing continuous monitoring regulations. Under Rule 9, TACB can reasonably require the measurement and monitoring of emissions of any source and the maintaining of records on the measurement and monitoring of emissions. The burden is on the source owner to buy, install, and maintain a continuous monitoring system.

QUALITY ASSURANCE IN CONTINUOUS MONITORING - Mike Osborne, Quality Assurance Branch, Environmental Monitoring Support Laboratory

The Quality Assurance Branch of EMSL has undertaken an ongoing survey of continuous monitor field performance. The purpose is to gather data for evaluating how well continuous monitoring systems work over the long term. There is a need to know if monitoring technology is sufficiently advanced to justify their requirement

The initial survey included boilers, sulfuric acid plants, and smelters. Extractive NO_x and SO_2 monitors were evaluated. National Bureau of Standards certified SO_2 and NO cylinders were used to calibrate EMSL gas monitors, which in turn were used to calibrate the cylinders to be used in the field. EMSL continued to evaluate the stability of the mixtures in these cylinders. Nineteen monitors, 13 SO_2 and 6 NO_x , were surveyed.

Some conclusions:

1) Continuous monitor devices can perform well.
2) Some types of monitors consistently perform better than others.
3) The process being monitored has no effect on monitor performance.
4) Probes, delivery systems, and monitors all contributed to regular maintenance problems.
5) The two most prominent maintenance problems were clogging of probes and sample lines, and condensation in sample lines.

It should be noted that sample transport systems were not evaluated, due to the inability to introduce calibration gases directly into probes. Sample conditioning systems were, however, generally included, as were data handling systems. A severe problem with maintenance record keeping was also brought out by the survey.

As far as traceability of the calibration gases is concerned, it was Mike Osborne's personal opinion that the cylinder tag value will be well within the tolerances of Methods 6 and 7, and thus should be acceptable. If traceability standards are promulgated, QAB plans to audit gas vendors to ensure quality control.

Future surveys of this type will attempt to include:

1) More different types of monitors (CO_2,O_2,opacity)
2) Evaluation of in-situ as well as extractive monitors
3) Nitric acid plants, petroleum refineries, more smelters
4) Use of calibration gases at 50% and 90% of full-scale concentration levels.
5) Introduction of calibration gases at probe inlets where possible

LOCATION AND SELECTION OF MONITORS- Karl Karst, Entropy Environmentalists, Inc.

Facilities that are required to purchase and install monitors are listed in various subparts of the Standards of Performance: Part 60 for new sources, Part 61 for hazardous air pollutants, or in Appendix P of Part 51 of the Federal Register. Each facility is really an individual case which will have specific problems. Because this is the case, interpretations of the laws are continually necessary and this demands that involved agency personnel have a working knowledge of the regulations.

Specific details for monitor locations are detailed in Performance Specifications 1,2, and 3 in Appendix B of Part 60. Some highlights for opacity and gaseous monitors are:

OPACITY MONITOR LOCATION

- Position must be representative of total emissions
- Recommended viewing across entire stack or duct
- Downstream of all control equipment
- As far as practical from bends or obstructions
- If downstream of bend, place in plane of bend
- Location to be accessible
- If two or more sources covered under the same standard exhaust emissions to the atmosphere using a common stack or duct, the source can locate one monitor after each facility or in the common stack or duct
- If the facilities are covered under different standards, each is to have its own monitor
- Optimum location can be compromised to avoid interferences such as water droplets
- Locate away from areas of high vibration or areas subject to large degrees of thermal expansion or contraction

GASEOUS MONITOR LOCATION

- Location must be representative or obtained data
- Must be able to be corrected to be representative
- Gases can be assumed to be non-stratified if location is eight equivalent diameters downstream of air in-leakage
- If sample area is stratified, data from monitor must be corrected to be representative (use of F-factor possible)
- If in stratified region and monitors (diluent and pollutant) are not of same type (extractive or in-situ), the extractive monitor has to use a multi-point probe
- Multiple facilities exhausting into the stack - same rules as for transmissometers
- Downstream of SO_2 scrubbers
- Diluent gas can be measured upstream or downstream of a scrubber if the source can demonstrate no air in-leakage. Important to keep basis straight
- Both the pollutant and diluent gases have to be measured either before or after an air preheater in the case of a fossil-fuel-fired steam generator. The eight diameter criteria doesn't apply before and monitors must be in-situ or extractive with multipoint probes.

Overall, it was brought out that the regulations are complex and subject to interpretations in many areas. A suggestion was made that for each type of monitor on a particular category of source, a list of (1) what is required, (2) what is not allowed, and (3) what is negotiable should be compiled.

For selection of monitors three steps are followed:

(1) check the applicable subpart to determine what has to be monitored, what spans are necessary, what conversion approach is applicable, and what performance specifications have to be met.

(2) check the Performance Specifications which state what the monitor must be capable of doing.

(3) check the location of the monitor in the facility. This could dictate or recommend in-situ or extractive monitors with single or multi-point probe.

The regulations do not specify particular brands of monitors or what monitoring principles should be used. They do state which facilities have to monitor and what specifications the monitors have to meet.

SELECTION OF MONITORS - Bob James, TACB

1. Responsibility is that of the source owner. He is spending the money.
2. Agency cannot endorse any particular brand names of equipment. So be careful about criticisms and/or recommendations.
3. Monitors are not certified, except as operated at a specific facility. Each monitoring system is performance tested as installed.

4. Assistance
   (a) Become familiar with vendor representatives in your area. What companies have reps? This is important for suggesting monitor servicing later to sources.
   (b) Provide references to evaluation studies.
   (c) Remind people that all systems are to varying degrees, user sensitive.
   (d) Give names of users if possible.
5. Self-education - Learn about different types of monitors and limitations and advantages of applications.
6. Explain that it is difficult for the vendor to supply a demo. The instrument alone does not do the job. Entire system required.

LOCATION OF MONITORS, AGENCY EXPERIENCE, Rino Wong, Region VI

Three of the four sources evaluated by Region 6 had their monitoring equipment located between the boiler and preheater, a less than ideal location. The agency asked the source to either demonstrate non-stratification by means of a sample traverse, or move the monitor closer to the manual sampling port areas on the stack. All three of the sources elected to move their monitors.

The problem here is the agency is rarely involved with the monitoring systems until after their installation, and while the best location from the perspective of comparability of data to manual tests for the continuous monitors would seem to be in the manual sampling port area, most sources are reluctant to install the continuous monitors on the stack due to problems with maintenance and accessibility.

SELECTION AND LOCATION OF MONITORS-SOURCE EXPERIENCE
Roy Woods, Du Pont

On a particular stack, Du Pont has installed a transmissometer and extractive SO_2 and NO_x analyzers. An O_2 analyzer, for control purposes, is located in ductwork other than the final stack. The transmissometer was installed at a location 3.2 diameters up from the stack from the breeching (bend) and 2 diameters down from the stack exit. Manual sampling ports and platform are also located at this level.

Problems arose concerning the location of each monitor. These have been rectified, at some expense, as follows:

The transmissometer was not located in the plane of the upstream bend. Rotation of the instrument about the axis of the stack also involved rotating the sampling platform and access ladder, an operation which cost approximately $20,000 and two weeks.

The probe for the extractive SO_2 and NO_x instruments had to be moved up the stack, to the level of the manual sampling ports. This requirement is not specified precisely in the Federal Register; specification that the extractive probe be at the location of the sampling ports would be beneficial.

The O_2 analyzer, installed to monitor excess air, is not in the proper location for obtaining reliable data for use in subsequent F-factor calculations. A second analyzer placed on the stack is needed, and is less expensive than moving the existing monitor.

Installation problems are not the only cause for expense. Du Pont has found that calibration and maintenance of monitoring instruments can be expensive. Examples:

NBS certified calibration gases cost $50-100 per cylinder (approx. 150 cu. ft.).

Buying and calibration of span gases cost $2000-2500 per set of four cylinders.

Valves and tubing for semi-automatic calibration were expensive.

Calibration checks on the SO_2 and NO_x monitors require one man-hour per day. Cost: about $5000/year

The problems encountered at this particular source regarding monitor installation highlight the need for good communications between sources and agencies. Contact should be made before instruments are installed - better still, before plant construction. Written guidelines, perhaps in checklist form, would also help prevent situations such as were encountered by Du Pont. In the case of this particular installation, the construction permit from the state of Texas outlines continuous monitoring requirements. Better follow-up contact, apparently, is needed to continue answering questions before they can become problems.

REGULATION EXPERIENCE BY EQUIPMENT VENDORS TRANSMISSOMETER SYSTEMS

Dave Lester, LSI

Transmissometer systems have been developed to meet a wide variety of design requirements. Some of these requirements have been imposed by the opacity monitoring regulations, either directly or indirectly. Many others are outgrowths of the nature of the sources where the monitors will be installed, of the nature of the particulate to be measured, or of the nature of the transmissometers themselves. These factors are summarized below, along with some other problems to be aware of when dealing with transmissometers.

Design Requirements

1. Some older transmissometers utilized light sources with a high infrared content. Water vapor absorbs IR, and submicron particulates do not scatter the long IR wavelengths. Newer monitors use filters to remove much of the IR from the source beam.

2. The light beam should be uniformly bright over the entire angle of proejction. The angle of projection of the light source and the angle of view of the reflector (or receiver) should both be about 5°. An angle of projection greater than 5° will result in false high readings due to excessive scattering of the projected beam.
3. The built-in retro-reflector used for automatic zero calibration checks must be outside all of the optics of the system (except the reflector on the opposite side of the stack). Internal placement of the reflector will not reveal problems such as dirty windows.
4. When calibrating, some instruments are not bi-polar (they register negative inputs as zero); some have their zero set at a slightly negative point, so that a signal of 2-3% is required before a positive reading is registered. Be aware of these possibilities.
5. A 95% response time of less than 10 seconds is required. Most transmissometer systems are well within this (1-2 sec.). Fast response results in excessive spiking, making strip charts difficult to read and average; a slow response (2-3 minutes) would dampen the graph, making it easier to read.
6. The January 31, 1977 Federal Register does not allow lot testing of transmissometer systems at the factory. Lot testing for response time and other parameters not affected by installation would be more reasonable and economical than testing every instrument.

Potential Problems After Installation

1. When using neutral-density filters for calibration checks, remember:
   a. Traceability of filters to NBS standards is informal, if possible at all.
   b. Filter must be placed perpendicular to the light beam, so that the path length through the filter medium is not lengthened, except:
   c. For double-path systems, the filter will reflect some some light back into the receiver, so align it 3° to 4° off-axis to eliminate this source of bias.
   d. Filters must be clean; no fingerprints, dust, etc.
2. Regulations call for zeroing transmissometers on a clean stack once a year. Some problems with this:
   a. Some stacks are never clear, especially if several sources feed a common stack.
   b. Drafts can keep dust airborne in a "clean" stack after shutdown; maintenance work (i.e., welding) can also stir up dust.
   c. Rain coming down a clear stack will register on the instrument.

3. In-situ testing of the instrument is still important, for several reasons:
   a. The path length of the light beam (stack diameter) may not be what the designer was told and the instrument calibrated for.
   b. The instrument can get out of alignment due to wind, heat expansion in a metal duct, or other factors. Alignment drift is a common source of positive error.

REGULATION EXPERIENCE BY EQUIPMENT VENDORS-EXTRACTIVE SYSTEMS
Bill Fuller - Du Pont

Certification and performance of extractive gas monitoring systems are proceeding without any major problems. Some problem areas that have been observed are the interpretation of some of the regulations, improper calibration of instruments by other than the vendor, improper analysis of calibration gases, and calculation errors during certification.

The certification process requires 2-5 days on-site and an elapsed time of about 45 days total to collect and report data. Errors are often made in summing an absolute mean value and a 95% confidence interval for a series of tests. Check also that reference mean value and the calibration gas mixture value. Also watch for "swamping" of the data by a large confidence interval when using only a few data points (3 or 4).

Reputable equipment should certify the first time. Steps which may be taken to ensure a sound certification test include:

1. Adequate planning before the sampling begins, so that the procedures are very clear to all personnel involved.
2. Good communications between vendor and tester.
3. Acquisition and review of equipment manuals by operator and observer before the date of the test. Operator, observer, and tester should be aware of what is going to be involved.
4. Insuring that the tester will analyze his samples properly. Check titrations for SO_2 concentration performed on site, under observation, if at all possible, to avoid potential surprises.
5. Assure that the calibration gas value is well established. A cylinder should be good for more than six months of automatic, daily calibrations. Changing the cylinder every six months will guard against "old" gases changing in concentration.

REGULATION EXPERIENCE BY EQUIPMENT VENDORS
IN-SITU SYSTEMS (Harry Lord - EDC)

In-situ systesm utilize absorption spectroscopy. A beam of light is sent across the gas stream, and specific wavelengths are absorbed by certain gases. Receptors are then designed to look for attenuation in the specific wavelengths of interest. Opacity, SO_2, NO, CO, and CO_2 can be measured in this way. Some characteristics of in-situ monitors follow:

1) very fast response
2) concentrations are averaged out across the stack- stratification is not a problem
3) readings are on a wet basis
4) results can be recorded in ppm
5) temperature adjustments are made in real-time

Calibration of in-situ gas monitoring instruments is similar to calibration of transmissometers. For the zero calibration, what is known as a "zero jig" is used, where a separate light source shines directly into the analyzer, by-passing the gas stream. For span checks, a sealed cell containing a known concentration of the gas of interest is placed in the zero jig beam, so that the beam travels through the same number of absorptive gas molecules as would be encountered in a traverse of the stack.

Another type of span calibration has been developed, and involves the incremental addition of known concentrations to the incoming signal. In this way, the light beam is still traversing and monitoring the gases in the stack. Verification that the span is acceptable is merely an exercise in curve-fitting.

Most of the problems associated with in-situ systems involve aspects other than the monitor itself. Among the problems that have surfaced to date:

1) The requirement for offsetting the zero point on the monitor interferes with the curve-fitting described above. This problem can be avoided by performing the zero offset on the recorder, rather than on the monitor.
2) Cutoff of power to the monitor, even if it has been provided with a discrete power supply.
3) Difference in readings at the instrument and on the recorder. Calibration of the recorder is important.
4) Use of too many pens (4 or 5) on the same strip chart. Try to have charts limited to 2 pans each, with all traces clearly labeled.

MONITOR PERFORMANCE TESTS - PRETEST MEETINGS

Bob James, TACB: Roy Woods, Du Pont; Lou Paley, DSSE (stand in for tester representative)

Pre-testing consultation between the testing, agency, and source personnel was emphasized before performing tests on the monitors, if not in the form of a meeting, then by telephone or letter. The time and money saved by the pre-test communication are the main reasons for holding such a meeting.

Meetings should cover the following points:

1) decide what to do about location and stratification problems
2) clarify regulations
3) devise a test schedule to be followed. If facility performance test and monitor performance test are to be done in the same week, careful planning is extremely important. Without working out a schedule, task completion in one week is doubtful.

4) review prerequisites to performance and compliance testing.

Roy Woods mentioned five benefits of the meetings in the source's experiences:

1) By meeting with the agency and tester face to face, all parties had the same information prior to testing; questions were answered which prevented later problems.
2) The agency provided planning assitance to the source (suggested running the compliance and performance tests concurrently).
3) It was decided that a SO_2 probe be moved to a better position.
4) It was found the Lear Siegler monitor had to be certified. This was done in time to proceed with testing.
5) Most problems were resolved before the testing began; therefore, no delay or rescheduling was required.

In the case of Du Pont, final scheduling was done on a daily progress/daily plan ahead basis. Again, pre-test planning made this much easier. Proficiency of tester was a critical factor. He was able to do NO_x sampling while SO_2 samples were in progress, for example.

Lou Paley listed what should be accomplished at the meeting from the tester's viewpoint.

1) All questions should be asked and answered concerning all aspects of the testing.
2) The scope of the work should be outlined for the tester.
3) Physical dimensions, equipment requirements, etc., should be determined.
4) Each party should denote a leader or speaker to answer questions arising in the field during the actual testing.

PERFORMANCE SPECIFICATION TEST PROCEDURE

Karl Karst, Entropy Environmentalists, Inc.

The performance specification test procedures is set up to look at all the components of a continuous monitoring system: sampling, interface, sample conditioning, sample transport, analyzers, and data handling. When considering the monitor test, four questions must be answered:

1) Who has to run the performance test?
2) When does the test have to be run?
3) What has to be done during testing?
4) What do the results have to be?

WHO

If the source is of sufficient size in an affected source category, the monitor testing must be run. Affected facilities are outlined in the Federal Register.

If a monitor was purchased before Spetember 11, 1974 and installed before October 6, 1975, the source is exempted from running the monitor performance test until September 11, 1979.

If a monitor was purchased after September 11, 1974 or installed after October 6, 1975, the testing must be run as covered under "WHEN" below.

WHEN — The monitor specification test can be run during the performance test for compliance (within 180 days of initial starting or within 60 days after reaching maximum produciton rate) or up to thirty days after the compliance test.

The test report must be submitted within sixty days after the test is completed.

WHAT (TESTING) — Specific tests are different for opacity, pollutant and diluent monitors.

All monitors have a 168 hour operational test period where only 24 hour adjustments can be made (unless specified otherwise by the vendor).

All monitors are tested for zero and calibrate drift at two and/or twenty-four hours and response time.

WHAT (RESULTS) — Monitors must meet performance specifications as outlined in Appendix B, part 60.

Only SO_2 and NO_x monitors have to be checked against manual methods and must be accurate to ± 20%.

Suggestions were made that it is just as important to determine accuracy of the diluent type monitors and process monitors in order to obtain accurate measurements of emissions.

PERFORMANCE SPECIFICATION TESTS - SOURCE EXPERIENCE

Roy Woods, Du Pont

A major concern that Du Pont encountered in working with the emission monitors was the effects of plant downtime on the conditioning and operational test periods. Since the object is to see how well the monitor works, rather than the source, the concensus was that the conditioning or testing period need not be restarted, but that the hour count be resumed at the point of plant shutdown. In other words, the monitor must operate on a "dirty" stack for 168 hours without breakdown before testing can begin. Other pertinent questions and comments were:

1) Can the monitor be calibrated during either the conditioning period or the operational test period?
2) Why span SO_2 and NO_x monitors at 50% and 90% of the specified range, especially if, for example, a NO_x monitor or a gas fired boiler will usually read about 30% of full range?
3) For O_2 analyzers, their logarithmic nature prevents spanning accurately at 50% and 90%. Again, since O_2 will usually read about 2-3% (for boilers), why not span nearer to operating range?

4) Suggest locating extractive probes near manual sampling ports to simplify performance testing.

CONDUCTING PERFORMANCE TESTS- Roy Woods, Du Pont; Lou Paley, DSSE (stand in for tester)

Roy Woods told of the source's experience in conducting performance tests. The biggest problem in conducting the tests was the weather conditions. NO_x samples were taken using both natural gas and #2 fuel oil. This resulted in two levels of NO_x values to use in accuracy determination. It was decided that all the tests be taken on the same fuel. It was also recommended that enough fuel be on hand to complete all of the testing.

Lou Paley had two questions from the tester's viewpoint: 1) when using a multi-point gas monitor probe, it is assumed that there is some stratification in the duct, so where should the tests be taken, and 2) how should the tests be spaced time-wise? Both questions did not receive definite answers.

OBSERVATION AND EVALUATION OF MONITOR PERFORMANCE TESTS - Rino Wong, EPA Region VI

This presentation was concerned primarily with specific experiences and problems encountered by Region VI in the enforcement of continuous monitoring regulations. There are 18 sources in Region VI that are required to comply with the monitoring regulations; ten of these had their monitors before the cutoff dates, and are waiting until the 1979 deadline to act.

Two of the remaining eight sources burn pyrolysis fuel oil (p.f.o.), and a third burns a p.f.o. mixture. Since p.f.o. has been defined as a non-fossil fuel, these sources are not covered as of the present. Requiring sources to test while burning #2 fuel oil, which is similar to p.f.o., was tried but dropped because sources question the motive behind being asked to test while burning a fuel they do not plan to use normally.

One source, which used a computer data handling system, preferred not to reprogram their system to meet the 10% zero offset requirement. A voltmeter was attached to the instrument itself (terminals are usually provided) and voltage readings correlated to the computer output. It was also suggested that the zero offset be done on the strip chart recorder rather than on the monitor, if possible.

Regulations require that 27 NO_x samples be taken in groups of three. Each group of three samples must be taken within a three minute period and no more than one set is to be run in any one hour.

Typically, these NO_x tests are spread over three days, at nine per day, and the SO_2 and zero span tests are interspersed among these. Though all the testing could be done in one day, a three or four-day testing schedule is preferable. Scheduling procedures, in general, are not yet well defined.

OBSERVATION AND EVALUATION OF PERFORMANCE TESTS

Bob James, TACB

One important function of the observer is to insure proper reference method testing. If the testing is not being done correctly, stop it, make corrections (start over if necessary), and review proper procedure with the tester. Reference method tests must be done as accurately as possible since these are the standards by which the monitoring systems are judged. Numerous points of analytical technique, including timeliness of procedures, can be invoked to ensure accuracy. Two examples: 1) Do not let NO_x sample bombs sit for more than 24 hours before recovery. Recovery as soon as possible after 16 hours is desireable. 2) Titrations for the SO_2 samples should be done in the field (Bill Fuller's experience). The observer should be thoroughly familiar with Appendix B performance test procedures, and also understand how the instrument works. Instruction manuals and cooperation from the vendors, source personnel, and operators can only improve the situation. The observer should witness at least one zero-span check and one response time test.

EVALUATION OF PERFORMANCE TEST DATA - Phil Schwindt, Region VI

Phil Schwindt discussed the procedures followed by Region VI in evaluating performance tests. Region VI requires all raw data sheets be included in the report so that calculations can be verified. Such action may seem time-consuming, but all calculations are checked. This check has on occasion changed a source's compliance status. All calculation sheets for particulate and gaseous tests and calculations of F-factor are included in the report, along with the trip report submitted by the observer. All data is evaluated and the evaluation report and suggestions are sent to the enforcement division. If a source is not in compliance, the agency will usually require a retest of the source performance before going out for an actual field inspection. The format for the performance test report is basically the same as that of the compliance tests, since the tests are often concurrent.

IMPORTANCE OF CALIBRATION AND FOLLOW-UP INSPECTIONS

Bob James, TACB

In order to validate data obtained under 40CFR60 and 40CRF51.19e, a program of quality control over data submitted from industrial monitors will need to be established. Without on-site inspections and calibration checks, reported data will be of questionsable reliability. During a one year survey of continuous monitors, eighty percent of all plant monitors inspected by the Texas Air Control Board were found to be either non-operational, incorrectly calibrated, or improperly operated (these were pre-NSPS). Inspections must be held since there is no guarantee that the calibrations and maintenance will be kept up.

The major problems for the plant sources right now are not so much in performing calibrations, but in interpretation and clarification of regulations. The problem is checking calibrations. TACB would like to have all SO_2 and NO_x monitoring data based on a common standard. However, it is not within present resources to transport a primary standard method or cylinder throughout the state and check each and every monitor. A viable alternative is to set up a spot check program.

Bob gave a slide presentation on the use of TACB's analyzer as an inspection tool. The TACB monitoring system is a mobile unit utilizing a very simple sample conditioning system. If the inspector calibrates both systems on one span gas (company or TACB), then the two independent measurements of pollutant concentration should be the same after correcting for moisture. If not, a problem wiht the company monitor is indicated. Sometimes there is no other means of obtaining such an indication.

Bob emphasized the cost and portability advantage of such an instrument compared to a typical installation system for extensive use in inspection work.

TRANSMISSOMETER PERFORMANCE AND INSPECTION

John Key, TACB

There is no set procedure for inspecting transmissometers. However, several points were covered in John's discussion.

Read plume on the way into the plant so as to get a general idea of what your results should be.
At the monitor readout location, watch a zero and calibration check if possible.
Check charts for any variations in process and compare with monitor readings.
Determine character of output: optical density vs. opacity, single or double pass, pathlength displayed (instrument or stack exit), full scale range.
Review log book for calibrations, maintenance.
Check other monitors for verification of load shifts. Look for correlations between monitor readings.
Check fuel flow and other changing operating conditions.
Read and use monitor operating manual - beforehand if possible - to better understand ambiguities in readouts.
Inspect the monitor itself. Record serial number and span calibration filter value for future information , should communication with the vendor be necessary.
Evaluate suitability of installation location: plane of bends, diameters upstream & downstream. Record duct or stack dimensions @ installation and @ exit; also exact instrument pathlegnth.
Check purge systems, filter for clogging, pinched hoses, etc.
Make sure the access covers are in place to avoid problems later.
Verify alignment if provisions have been made to do so.
Compare on-stack readout (if any) with control room output.
Check that the transmissometer is mounted above the plane of the sampling ports to prevent sampling probes from interfering with opacity readings.

DATA HANDLING REGULATIONS - Larry Jones, ESED

Larry Jones discussed data handling regulations concerning the recording and verification of monitoring data. Originally, the purpose of the continuous monitoring systems had been to use the data as a maintenance check to assure the continued compliance of the plant source. The data however, cannot be used to determine compliance; a source test must be performed. Therefore, the monitor is not being used for enforcement of Federal standards with the exception of smelter standards. Because of indecision concerning use of data received at this juncture, no specific format has been laid out for the reporting of the data. It is felt this format will come when it is decided how the information will be used. The development of a programming system whereby all of the data will be compiled for the purpose of comparing plant performance nationally has been proposed. For the present, however, only specifications as to how data is to be reported and what data must be reported have been made. Excess emissions, startup or shutdowns of the facility, malfunctions of control equipment and malfunctions in the monitoring systems must be reported every quarter. A negative declaration must also be reported.

It is minimally required that all opacity data be reduced to six minute averages to be consistent with Method 9 so there will be a direct comparison between opacity data from the continuous monitoring system and from field observations. All averages start on the hour and ten are compiled in one hour. One hour averages are used for gaseous pollutants because analog integrators for integrating data were reasonably available for integrations up to one hour, after which they tend to get more expensive. Any available data given by the monitor during the hour should be included in the report, whether there was a malfunction or not. It is also required that the data output be reduced to units of applicable standards for excess emissions only.

GENERAL COMMENTS ON CONTINUOUS MONITORING DATA - Lou Paley

Any data is of questionable value if all potential sources of error are not accounted for in some fashion, including estimates.

A continuous monitoring system consists of elements other than the monitor itself. Sample conditioning devices, sample extraction devices, data handling devices, and the human element in data transfer processes can introduce errors. Strip charts are often difficult to read, maintenance records are frequently incomplete, and old data difficult to access. Factors such as these must be taken into consideration when continuous monitoring data is interpreted or analyzed.

Some of these difficulties are outgrowths of specific shortcomings in the regulations. Items needing clarification are:

- guidelines for record keeping, data averaging
- specifications for components in the system in addition to those for the monitor itself
- acquainting sources with F-factor, other data handling methods

limiting and specifically identifying the number of pens on the same strip chart
keeping records of zero and span calibrations
means of verifying calculations
guidelines for determining whether data "looks" good or bad
provisions guaranteeing accessibility of past records
more coordination among regional offices
standardization of reporting formats

In the final analysis, too little data has been generated and analyzed, and too little experience accumulated to smooth out all the wrinkles at this point in time. As more questions arise and are answered, a lot of this will fall into place. We should be a lot better off in a year or so than we are right now.

EVALUATION AND USE OF EXCESS EMISSIONS REPORTS - Gibbs

The fact that continuous monitoring regulations are not generally used for enforcement points up a very basic problem with monitoring, namely, that we don't really know where we are going with the regulations. The EPA must decide either to enforce the continuous monitoring regulations, or let the whole matter drop and say to the source, "Sorry, we didn't really mean it".

Many sources are still unclear as to what excess emission reports are to be used for. As a result, the reports are submitted in a variety of formats. Some are sent out immediately following an excess emission, and some are incorporated into the quarterly reports. Some of the excursions are a result of process upsets, and some result from problems with the monitors. Guidelines, manuals, and training of agency personnel are needed to help both sources and agencies understand the regulations and, thus, how to resolve these types of problems.

Some additional points:

Continuous monitoring regulations and data should be useful to sources as well as agencies.
Some equipment arrangements are unique. If a new source doesn't fit the regulations, have them submit an alternate plan for agency approval.
Don't look at excess emission reports only. Review all reporting done by the source to get the total picture.
Don't visit source only when problems arise or violations occur. Come around just to check up, once every 6 months or so, to resolve little problems.
Copies of inspection manuals, etc., should be made available to sources. There should be nothing secret about inspection procedures.
Keep instrument vendors, source testers available for answers as the need arises.

REGULATIONS REVISIONS - Larry Jones, ESED

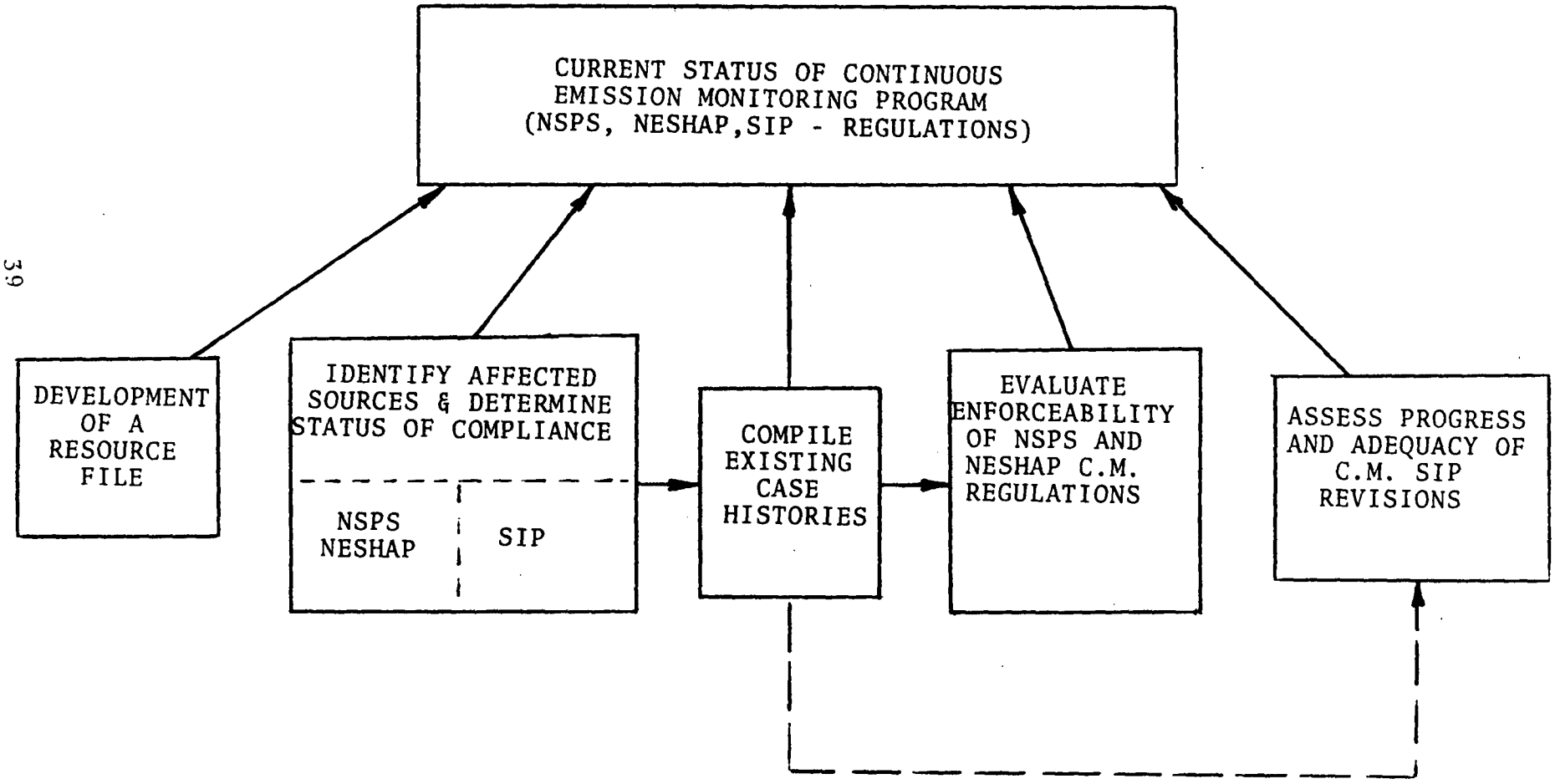
No further revisions are going to be made on Method 9 at this time. However, plans are being made to make the LIDAR system available, and minor changes will be made to allow the EPA to approve the system. Wet F-factors have been approved.

AGENCY STRATEGIES AND FUTURE PLANS - Lou Paley, DSSE

Lou Paley concluded the conference with the future plans concerning the continuous monitors. See Figure I. At the moment, he feels that all of the regions need to work together in compiling data and information on all the continuous monitoring systems and to find answers to arising questions. It will be necessary to better understand the regulations and to clarify their meaning. Further, we need to improve various types of training of personnel so they can answer the questions concerning regulations, evaluate incoming data, do inspections, etc. Manuals need to be developed and used. Sources need to be educated and assisted in the use of these monitors. A good data base needs to be developed to use for setting operating standards, making comparisons, etc. The regions themselves need to start implementing the NSPS nad NESHAP continuous monitoring regulations. Also, start acting on the State Implementation Plan monitoring provisions. Regions should provide assistance to the states on the SIP's in lining up sources for possible collaborative testing.

The agency's future plans are basically to identify the need for continuous monitors and their use, and to develop a plan for the use of available data. Direct enforcement through the use of continuous monitors will be sought. An overall continuous monitoring program was presented graphically. See Figure 2.

FIGURE 1. PHASE 1. CONTINUOUS MONITORING ACTIVITIES

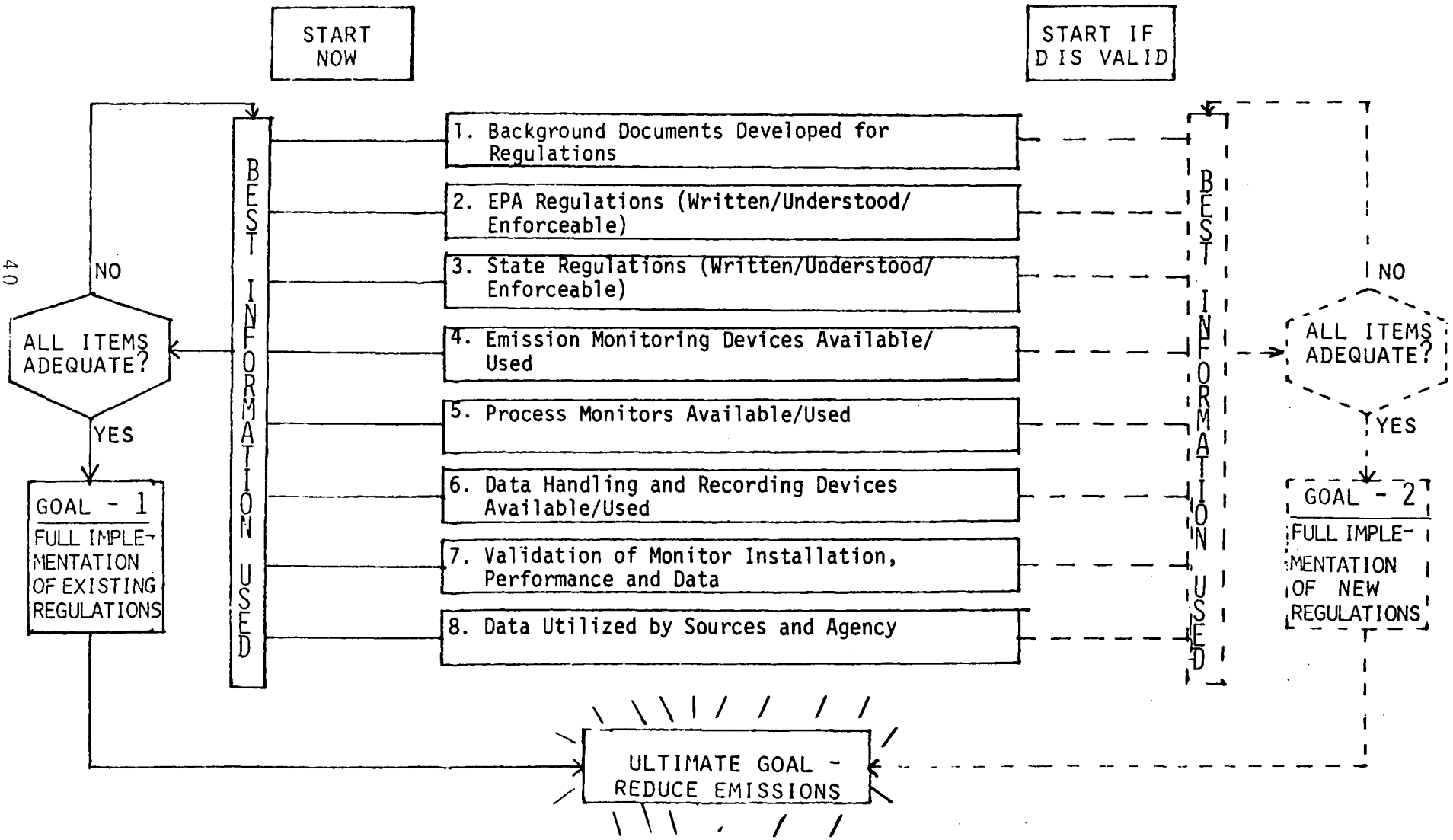


ACTION ITEMS FOR EXISTING REGULATIONS (SIP, NSPS, NESHAP)

FIGURE 2.

POTENTIAL ACTION ITEMS FOR DIRECT ENFORCEMENT USING C.M.'s

A) ADEQUACY OF EXISTING REGULATIONS?
B) DEVELOPMENT OF VIABLE ALTERNATIVE CONCEPTS?
C) JUSTIFICATION - EFFECTIVENESS?
D) DEVELOP PROGRAM TO IMPLEMENT NEW REGULATIONS.



SECTION IV

QUESTIONNAIRE RESULTS-(PRESENT PROBLEMS & FUTURE PLANS)

At the conclusion of the conference, a questionnaire was completed by the majority of the people attending the two and one-half day meeting. The response was excellent and showed that the conference was of value to all present.

Most people answered the questions with definite emphasis on their own responsibilities. Many felt that a separate conference specifically developed for persons with their own job responsibility would be very beneficial. When this was the case, most people listed the subjects they thought should receive special interest.

The salient points discussed under five questions are listed below. The remarks are broken down as being received from four groups of people: a) Surveillance and Analysis, b) Air Enforcement, c) Air and Hazardous Materials and d) Miscellaneous.

1. WHAT PROBLEMS HAVE YOU ENCOUNTERED IN IMPLEMENTING THE FEDERAL REGULATIONS?

S&A
- Identifying and notifying sources subject to the regulations.
- Lack of experience, equipment, and manpower. Need to train state employees to observe and evaluate performance tests.
- Lack of continuous monitoring background.
- Regulations need clarification.
- Need input to facility at early stage for monitor locating; owners, testing companies, and design engineering companies are not aware of provisions of the monitoring regulations.

ENFORCEMENT
- Uncertainty in knowning what to do with excess emission reports.
- Difficulty in obtaining compliance from small plants and plants having boilers which use fuel that require monitors on an auxiliary basis (where combustion of primary fuel does not require a monitor).

A & HM
- States have not submitted SIP revisions; the Region has not promulgated for the state.
- Lack of priority of resources for SIP continuous emission monitoring.

MISC.
- Ambiguities in regulations (Example: when to use reference method analysis of span gases or NBS

traceable assay).
- Non-specific language in regulations dealing with monitor installation specifications.

2. IN WHAT AREAS DO YOU FEEL EDUCATION/MANUALS/ASSISTANCE IS NECESSARY IN ORDER FOR THE CONTINUOUS MONITORING PROGRAM TO BE SUCCESSFUL?

S&A
- Education on continuous monitoring regulations for agency, source and contractors. Inspection manuals and courses (including laboratory sessions).
- Background documents.
- Better communication between regions.
- Manuals for source operators.
- Better methods of data handling-have daily values available for inspectors to review on site.
- Additional guidelines are needed for monitor location based on experience and allowable alternative procedures.
- Contractors should be developed to assist Regions in conducting inspections of monitors.

ENFORCEMENT
- Desperately need first inspection manual.
- Detailed discussion of what are excess emissions vs. malfunctions. Discussion of when to take action and what action to take after receipt of excess emission reports.

A & HM
- Need to generate data to demonstrate the observer-opacity meter correlation for each source category, or adapt meter as reference method.
- There should be no rush toward SIP revision until the states are competent to assume the program. Efforts should be in helping states.

MISC.
- Formal guidelines to use for inspection reports.
- Booklets of standardized data reporting forms for sources to use for reporting results of monitor performance tests.
- Need for opacity vs. visible emission correlation.
- Develop test procedures for installation of opacity monitors and gaseous monitors.
- Field calibration check methods to be used for inspection of opacity monitors.
- Access to EPA published information.
- Education and manuals on principles of instrumentation and monitoring systems.

3. WHAT TYPE OF ASSISTANCE SHOULD BE PROVIDED BY THE FEDERAL EPA IN ORDER FOR YOUR TO MORE EFFECTIVELY PERFORM YOUR JOB?

S&A

- Set priorities in order for program managers to put all activities in proper perspective, and if necessary, shift resources accordingly.
- Technical workshops-discussions of regulations, delegation, etc.
- More background documents and manuals.
- Need a central clearing office for approved regulation alterations, experience, questions, and general clarification to be used by agency and source personnel to establish consistent decisions.
- Assistance in training state and regional employees.
- Directories to determine who to contact for specific information on monitors, interpretation of regulations - to establish effective means of communications.

ENFORCEMENT

- Monitoring will never have a high enforcement priority as long as monitor violations are not enforceable.
- Resolution of SO_2 monitor/fuel sampling issue for boilers.
- Need to emphasize the importance and time required to accomplish this program to District Directors and Regional Administrators. Otherwise it will be difficult to find time to work in this area.
- Bibliography of available continuous monitoring related documents.
- Change the regulations to allow clear use of continuous monitors for enforcement.

A & HM

- Assistance in running workshops for the states for delegation of regulations, as well as general requirements of the states under delegation.
- Financially and administratively supporting desired state-sponsored conferences with major sources affected by the 10/6/75 Federal Register.

MISC.

- Improve availability of technical publications.
- Quick reponse to requests for opinions and intent of the law in interpreting the Federal Register.
- Start a program of standardization for applying the regulations throughout the country. Cover usual and unusual cases on an individual basis.

4. WHAT ASSISTANCE IS NECESSARY FOR STATES TO IMPLEMENT SIP's?

S&A
- Lists of contacts for technical information.
- Convince the states that SIP revisions are necessary.
- Convince states that this program will be worth the effort.
- Workshops.

ENFORCEMENT
- Technical assistance, manuals, training, workshops, etc.

A & HM
- The state needs to gain expertise in continuous monitoring. Much will come from experience, but suggest getting contractor assistance from vendors to get program going.
- Assistance in drafting enforceable regulations.
- Technical assistance for workshops on calibration and inspection procedures.
- Eventual funding for additional enforcement inspectors.

MISC.
- Push state directors; working level personnel are ready.

5. WHAT KIND OF SUBJECT MATTER WOULD BE OF BENEFIT TO YOU AT FUTURE CONFERENCES OR WORKSHOPS?

S&A
- More information on equipment and principles of operations from vendors or other speakers.
- Written documentation on what to do to remain consistent between regions in problem areas where sources can not strictly follow the Federal Register.
- More discussion of the vendor's field experience.
- Need to exchange experiences of various agency personnel.
- A workshop with more source representatives who have had experience and can comment on their problems.
- A workshop on monitors.
- Presentations on changes in the regulations or a need for changes.
- Need legal input on various questions.
- A vinyl chloride continuous monitoring workshop should be developed to assist regions in conducting inspections.

ENFORCEMENT
- Detailed discussion of what are excess emissions vs. malfunctions; discussion of what to do with reports.
- Experience of practical applications of monitoring programs.

- Enforcement examples.
- Demonstrations of continuous monitor uses by and for enforcement.

A & HM

- Information on how to develop continuous monitoring regulations for state SIP's.
- Discussion of approvability of existing state regulations.

Based on the results of this questionnaire, it appears that there is a future need for several types of conferences or workshops. First, meetings could be held for persons generally involved with SIP, NSPS, or NESHAP regulations for continuous monitors. And secondly, they could be slanted towards interests of the observers, inspectors, sources, or those generally involved.

The response of the persons attending the conference in Dallas showed that there is much work that needs to be done and many questions that need to be answered. As was pointed out during the meeting, programs to fulfill some of the needs listed on the questionnaire are in the planning stages or are presently being pursued. Others have to be given serious consideration. The conference response provided excellent input from persons working directly with continuous monitoring activities and established a good basis from which to develop programs for implementing continuous monitoring regulations.

APPENDICES

APPENDIX A

MAIN FIELD CONTINUOUS MONITORING CONTACTS (NSPS & SIP)

REGION

I.

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60 Westview Street
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II.

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III.

Robert Kramer
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IV.

Doyle T. Brittain
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Surveillance and Analysis Division
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Phone: 404/546-3197 (FTS 250-5197)

Jim Wilburn(data validation & use)
Chief, Air Enforcement Branch
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V.

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VI. Phil Schwindt
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VII. John J. Giar
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VIII. John R. Floyd
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IX. Ken M. Kitchingman
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X. George C. Hofer
Chief, Air Surveillance
Surveillance and Analysis Division
Region X, EPA
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Seattle, Washington, 98101

OTHER CONTINUOUS MONITORING CONTACTS

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National Enforcement Investigations Center
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Denver Federal Center
Denver, Colorado 80225
Phone: 303/234-4656

Bob James and John Key
Texas Air Control Board
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Austin, Texas 78758
Phone: 512/451-5711

Louis R. Paley (EN-341)
Division of Stationary Source Enforcement
401 M Street, SW
Washington, D. C. 20460
Phone: 202/755-8137 (FTS 755-8137)

Larry Jones (MD-13)
Emission Standards and Engineering Division
EPA/OAQPS
Research Triangle Park, N.C. 27711
Phone: 919/541-5421 (FTS 629-5421)

REGULATION (NON-FIELD) CONTACTS

I. Linda M. Murphy
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II. Dennis Santella
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III. Isreal A. Milner
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IX. Allyn Davis
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X. Clark Gaulding
Chief, Air Programs Branch
Air & Hazardous Materials Division
Region X, EPA
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Seattle, Washington, 98101

OTHER CONTACTS:

NSPS & NESHAP Determinations: Rich Biondi (EN-341)
Enforcement and Technical Determinations
Division of Stationary Source Enforcement
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Phone: 202/755-2564 (FTS 755-2564)

SIP Revisions: Gary Rust
(SIP Revisions)
CPDD MDL5
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Phone: 919/629-5365 (FTS 629-5365)

APPENDIX B

REFERENCE PUBLICATIONS

The following is a list of publications that deal with monitoring systems and related subjects. We refer you to these articles and documents hoping they will contain answers to some of your questions. The "PB" number following each document is the number used for ordering the document from the National Technical Information Services (NTIS). A small fee is charged for the documents.

APPENDIX B

REFERENCE PUBLICATIONS

Stationary Source Measurements Research Branch

Extramural Reports

11/76

Title	Contractor	EPA Numbers
Manual Methods for Sampling and Analysis of Particulate Emissions from Incinerators	A. D. Little	EPA 650/2-73-023 PB 238476/AS
Development of Methods for Sampling and Analysis of Particulate and Gaseous Fluorides from Stationary Sources	A. D. Little	EPA R2-72-126 PB 213-313
Development of a High Purity Filter for Analysis by Advanced Sensitive Analytical Techniques	A. D. Little	EPA 650/2-73-032 PB 230-886/AS
Infrared Absorption by Sulfuric Acid Vapor	Aeronutronic-Ford Corporation	EPA-600/2-76-191 PB 257088/AS
Fabrication and Installation of the Stationary Source Simulator	Aerotherm	EPA-650/2-75-015 PB 247231
Interferometric Instrumentation for Particle Size Analysis	Arnold Research Organization	EPA-650/2-73-034 PB 240584
Feasibility Study of Remote Monitoring of Gas Pollutant Emissions by Raman Spectroscopy	Avco Corporation	APTD-0658 PB 198-204
Test Program/Optical Measurement of SO and NO_2	Barringer Research	APTD-1486 PB 193-485
Long Path Spectroscopy Instrumentation for In-situ Monitoring of Gaseous Pollution/Urban Atmospheres	Bendix Corporation	APTD-0889 PB 205-256
Off-Line Analysis Programs for Long Path Spectrometer	Bendix Corporation	EPA 650/2-73-010 PB 212-625
Development of Instrumentation for Measurement of Stationary Source Aldehyde, Organic Acid, and Amine Emissions	Bendix Corpoation	EPA-650/2-73-010 PB 230-884/AS
Study of Infrared Techniques for Monitoring Stack Gases	Dalmo Victor	PB 187-391
Long Path Ozone Measurements by IR Technique	Dalmo Victor	PB 187-392
Passive IR SO_2 Sensor	Dalmo Victor	PB 187-390

Title	Contractor	EPA Numbers
Collection Efficiency Study of the Proposed Method 13 Sampling Train	Entropy Environmental, Inc.	EPA-600/2-75-052
Evaluation of Correlation Spectrometer as an Area Monitor	Environmental Measurements Inc.	EPA-600/2-75-077 PB 249113
In-Stack Transmissometer Techniques for Measuring Opacities of Particulate Emissions	Environmental Res. Corporation	EPA R2-72-099 PB 212-741
Evaluation and Modification of Fluoride Sampling and Analytical Methods (26 AAP-23)	Environmental Science and Engineering, Inc.	EPA 650/2-73-007 PB 230-954/AS
Evaluation of Measurement Methods and Instrumentation for Odorous Compounds in Stationary Sources	Esso Research and Engineering Company	APTD-1180 (Vol. 1) PB 212-812 EPA R2-73-180 (Vol. II) PB 223-654
Magnitude of SO_2, NO, CO_2 and O_2 Stratification in Power Plant Ducts	EXXON	EPA-600/2-75-053
Collection Efficiencies of Stack Sampling Systems for Vanadium Emissions in Flue Gases	EXXON	EPA-600/2-76-096 PB 256399/AS
Particulate Sampling Strategies for Large Power Plants Including Non-uniform Flow	Fluidyne	EPA-600/2-76-170 PB 257090/AS
Development of an Instrumental Monitoring Method for Measurement of Asbestos Concentration in or Near Sources	The Franklin Institute	EPA 650/2-73-016 PB 226-471/AS
Development of Infrared Scanning Spectroscopy for Remote Monitoring of Emission Spectra of Hot Gas Pollution	General Dynamics	EPA R2-72-052 PB 221-073
Field Measurements of Gas Pollutantin Ambient Air and from Stationary Sources by Remote Infrared Techniques	General Dynamics	EPA 650/2-73-026 PB 230-885/AS
Compact Sampling System for Collection of Particulates form Stationary Sources	General Electric Corporation	EPA 650/2-74-029 PB 240398/AS
Field Study on Application of Laser Coincidence, Absorption Measurement	General Electric Corporation	APTD-0981 PB 210-671
Performance Evaluation of Mobile Lidar System	General Electric Corporation	APTD-0968 PB 210-672

Title	Contractor	EPA Numbers
Development of Range Squared and Off-Gating Modifications for a Lidar System	General Electric Corporation	EPA 650/2-73-040 PB 228-715
Sampling Interface for Quantitative Transport of Aerosols	Illinois Institute of Technology Research Institute	EPA-650/2-74-016 PB 240423/AS
Sampling Interface for the Quantitative Transport of Aerosols--Field Prototype	Illinois Institute of Technology Research Institute	EPA 600/2-76-157
Design, Development and Fabrication of a Beta Gauge and Filter	Industrial Nucleonics Corporation	APTD-1150 PB 209-954
Development of Sampling Produce for Polycylic Organic Matter and Polychlorinated Biphenyls	Langston Labs, Inc.	EPA-650/2-75-007 PB 243362/AS
Development of In-Situ Prototype Diode Laser System to Monitor SO_2 Across-the-Stack	Mass. Institute of Technology, Lincoln Laboratory	EPA R2-73-218 PB 223-628/AS
Optical Method for Measuring the Mass Concentration of Particulate Emissions	Meteorolgy Research Inc.	EPA-600/2-76-062
Evaluation and Development of Nitrogen Oxide Monitors for Combustion Sources	Monsanto Research Corporation	APTD-0847 PB 204-877 PB 209-109
Instrumentation or Methods for Measuring Specific Particulate Substances Including Beryllium and Cadmium in Stationary Source Emissions (Phase I)	Monsanto Research Corporation	EPA R2-73-252 PB 232-088/AS
Conversion of Monsanto Model 3409 Chemiluminescent Ambient Air NO_x and SO_2 from Stationary Sources	Monsanto Research Corporation	EPA 650/2-73-027 PB 231-084/AS
Construction and Field Testing of Commercial Prototype Disc Diluter (26 AAP-27)	Monsanto Research	EPA-650/2-74-055
Remote Sensing of Pollutants	National Oceanic and Atmospheric Administration	EPA-650/2-74-113 PB 240168/AS
In-Stack Transmissometer Evaluation and Application to Particulate Opacity	Owens-Illinois	EPA-650/2-75-008 PB 243402
Infrared Gas Filter Correlation Instrument for In-Situ Measurement of Gaseous Pollutants	Philco-Ford Corporation	EPA-650/2-74-094 PB 239467/AS

Title	Contractor	EPA Numbers
In-Stack Transmissometer Measurement of Particulate Opacity and Mass Concentration	Philco-Ford Corporation	EPA-650/2-74-120 PB 239864/AS
Experimental Investigation of the Infrared Emission by SO_2	Philco-Ford Corporation	APTD-0760 PB 203523
Infrared Sensor for the Remote Monitoring of SO_2	Science Applications Inc.	EPA-650/2-75-041 PB 243478
Study of Low Backscatter by Particulates in Stack Emissions	Stanford Research Institute	EPA R2-72-089 PB 212-530
Development of a CW Lidar for the Remote Measurement of Smoke-Plume Opacity	Stanford Research Institute	EPA 650/2-73-037 PB 231-992/AS
Feasibility Study of In-Situ Source Monitoring of Particulate Composition by Raman or Fluorescence Scatter	Stanford Research Institute	EPA R2-73-219 PB 225-042/1AS
Development and Fabrication of a Prototype Mass Emission Data System	Systems Technology Association, Inc.	EPA 650/2-73-009 PB 232-013/AS
Continuous Particulate Monitors for Fossil-Fuel Combustion Sources	Thermo-Systems, Inc.	EPA 650/2-73-022 PB 231-919/AS
Development of a Subsidiary Emission Measurement Monitoring System	Thunder Scientific Corporation	EPA 650/2-73-008 PB 232-442/AS
Adaptation and Evaluation of Odor Measurement Techniques to Various Odor Sources (26 AAP-72)	TRC - The Research Corporation of New England	EPA-650/2-74-008-a PB 228-186/AS
Design and Construct a Protable Laser Interference Type Velocimeter for Stack Velocity Measurements	TRW Inc.	EPA R2-72-132 PB 213-263
Evaluation of Sulfur Dioxide Monitors Combustion Sources	TRW Inc.	EPA R2-73-163 PB 220-202
Feasibility Study of the Use of Resonance Scattering for the Remote Detection of Pollution in Stationary Source Emissions	United Aircraft Corporation	EPA 650/2-72-106
Filtration Characteristics of Glass Fiber Media at Elevated Temperatures	University of Florida	EPA-600/2-76-192 PB 257132/AS
Investigation of Extractive Sampling Interface Parameters	Walden Research	EPA-650/2-74-089 PB 242515/AS

Title	Contractor	EPA Numbers
Evaluation and Modification of Manual SO_2 and SO_3 Sampling Techniques	Walden Research Division of Abcor, Inc.	EPA R2-72-105 PB 215-887
Evaluation of Monitoring Methods and Instrumentation for Hydrocarbons in Stationary Sources Emissions	Walden Research Division of Abcor, Inc.	EPA R2-72-106 PB 226-657/5WP
Evaluation of Instrumentation for Monitoring Total Mercury Emissions from Stationary Sources	Walden Research Division of Abcor, Inc.	EPA R2-73-252 PB 232088/AS

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APPENDIX C

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16. ABSTRACT

The Division of Stationary Source Enforcement, in conjunction with the Region VI Office of the Environmental Protection Agency (EPA) sponsored a conference workshop in Dallas, Texas on February 15-17, 1977, on Stationary Source Continous Emissions Monitoring. This report includes a detailed summary of the Conference proceedings as well as consensus reponses by various EPA Divisions relating to many of the key questions and issues which arose during the course of the conference.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
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